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EXAMINER
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YAM, STEPHEN K

ART UNIT	PAPER NUMBER
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2878

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/517,547

Applicant(s)

SPRUCK, BERND

Examiner

Stephen Yam

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 18-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-21 and 23-36 is/are rejected.
- 7) ☒ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/10/04, 11/21/05
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 18, 19, 23, 27, 28, 31, 32, 34, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Leis US Patent No. 6,061,644.

Regarding Claim 18, Leis teaches (see Fig. 1-4) a method of determining a spatial position of an object (11a) (see Col. 3, lines 56-58), comprising the steps of mounting three light sources (12a-12c) (see Col. 4, lines 4-8, and since the markers can be either active or passive- see Col. 2, lines 43-46 and Col. 5, lines 26-30) on the object so that the three light sources define apices of a triangle (see Fig. 1-2); illuminating the light sources (see Fig. 4 and Col. 5, lines 9-13); simultaneously (see Fig. 4 and Col. 4, lines 39-60) recording the object and the illuminated light sources from a first (at (14L)) and a second (at (14R)) position; capturing (see Col. 4, line 61 to Col. 5, line 2) the positions of the light sources in recorded images from the first and second positions; and computing (see Col. 5, lines 3-12 and Col. 6, lines 17-20 and Col. 10, lines 15-17) the position of the object based upon positions of the illuminated light sources in the recorded images.

Regarding Claim 27, Leis teaches (see Fig. 1-4) a device for sensing the spatial position of an object (11a) (see Col. 3, lines 56-58), said device comprising three light sources (12a-12c) (see Col. 4, lines 4-8, and since the markers can be either active or passive- see Col. 2, lines 43-

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46 and Col. 5, lines 26-30) mounted on the object to define the apices of a triangle (see Fig. 1-2); two spaced apart image-recording devices (18L, 18R) each having an image recording area (see Col. 4, lines 11-14), the image recording devices being oriented such that the image-recording areas overlap (see Fig. 1 and Col. 4, lines 47-52); a control device (28/34) capable of illuminating the light sources and activating the two recording devices simultaneously (see Fig. 4 and Col. 5, lines 9-13 and Col. 9, lines 16-25) to record images the object and the illuminated light sources (see Col. 9, lines 21-25); and an evaluating unit (28), capable of determining positions of the light sources in the recorded images and computing a position of the object on the basis of the determined positions of the light sources (see Col. 6, lines 17-20, and Col. 10, lines 15-17).

Regarding Claims 19 and 28, Leis teaches the evaluating unit separates the images of the light sources from remaining image background to determine the positions of the light sources (see Col. 4, line 61 to Col. 5, line 2).

Regarding Claim 23, Leis teaches operating the light sources in a pulsed manner (see Col. 5, lines 9-12).

Regarding Claims 31 and 32, Leis teaches the light sources comprising infrared-light emitting diodes (see Col. 5, lines 16-23).

Regarding Claim 34, Leis teaches the light sources connected with the object in a stationary manner (see Fig. 1 and Col. 3, line 60 to Col., 4, line 3).

Regarding Claim 35, Leis teaches the light sources emitting (see Col. 5, lines 17-23) light at a pre-determined emission spectrum (visible + infrared spectrum) and the recording devices

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selectively accepting (see Col. 4, lines 11-13) light within the pre-determined emission spectrum (since a CCD imaging sensor is limited to sensitivity only in the visible + infrared spectrum).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leis in view of Morrison US Patent No. 5,187,540.

Regarding Claim 33, Leis teaches the device in Claim 27, according to the appropriate paragraph above. Leis does not teach the object comprises a head mountable display unit that can generate an image that is perceivable by a wearer of the head mountable display. Morrison teaches (see Fig. 1) a similar device for sensing the spatial position of an object (see Abstract) wherein the object comprises a head mountable display unit that can generate an image that is perceivable by a wearer of the head mountable display (see Col. 1, lines 12-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the object comprising a head mountable display unit that can generate an image that is perceivable by a wearer of the head mountable display, as taught by Morrison, in the device of Leis, to provide usage of the device for an aircraft environment, as taught by Morrison (see Col. 1, lines 12-15).

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5. Claims 20, 24, 25, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leis in view of Majoe US Patent No. 6,587,809.

Regarding Claims 20 and 29, Leis teaches the method and device in Claim 18 and 27, according to the appropriate paragraph above. Leis does not teach the control device is capable of extinguishing the light sources and activating the recording devices to simultaneously record an image of the object with the light sources extinguished by both image-recording devices, and the evaluating unit is capable of subtracting the image recorded with the extinguished light sources from the image recorded with the illuminated light sources, to determine positions of the light sources. Majoe teaches (see Fig. 1) a similar method and device with a control device (5) capable of extinguishing light sources (3a-3e) (see Col. 4, lines 59-63) and activating recording devices (7) to simultaneously record light intensity of the object with the light sources extinguished by the recording device (see Col. 6, lines 5-17), and the evaluating unit is capable of subtracting the energy recorded with the extinguished light sources from the energy recorded with the illuminated light sources, to determine positions of the light sources (see Col. 5, lines 23-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the control device is capable of extinguishing the light sources and activating the recording devices to simultaneously record an image of the object with the light sources extinguished by both image-recording devices, and the evaluating unit is capable of subtracting the image recorded with the extinguished light sources from the image recorded with the illuminated light sources, to determine positions of the light sources, as taught by Majoe, in the method and device of Leis, to compensate for ambient radiation for improved visibility of the light sources, as taught by Majoe (see Col. 3, lines 22-38 and Col. 6, lines 5-8).

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Regarding Claim 24, Leis teaches the method in Claim 23, according to the appropriate paragraph above. Leis also teaches simultaneous recording from both positions (see Col. 4, lines 40-47). Leis does not teach synchronizing the simultaneous recording from both positions with the pulsed operation of the light sources such as to alternately obtain a first pair of recorded images with illuminated light sources and a second pair of recorded images with nonilluminated light sources; and determining the light source positions on the basis of two subsequent pairs of first and second pairs of recorded images. Majoe teaches (see Fig. 1) a similar method with synchronizing the recording with a pulsed operation of light sources (3a-3e) (see Col. 4, lines 59-63) to obtain a first recorded light intensity pattern with illuminated light sources and a second recorded light intensity pattern with nonilluminated light sources (see Col. 3, lines 22-38 and Col. 6, lines 5-17). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the illuminated-light-source and nonilluminated-light-source recordings as taught by Majoe, in the method of Leis, to compensate for ambient radiation for improved visibility of the light sources, as taught by Majoe (see Col. 3, lines 22-38 and Col. 6, lines 5-8).

Regarding Claim 25, Leis teaches the method in Claim 18, according to the appropriate paragraph above. Leis does not teach illuminating the light sources individually and sequentially; and sequentially recording each individually illuminated light source to identify each light source. Majoe teaches (see Fig. 1) a similar method with illuminating the light sources individually and sequentially; and sequentially recording each individually illuminated light source to identify each light source (see Col. 4, line 57 to Col. 5, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to illuminate the

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light sources individually and sequentially, and sequentially record each individually illuminated light source to identify each light source, as taught by Major, in the method of Leis, to further differentiate between the light sources for reduced errors.

6. Claims 21, 26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leis.

Regarding Claim 21, Leis teaches the method in Claim 18, according to the appropriate paragraph above. Leis does not teach more than three light sources mounted on the object and only three light sources are illuminated during the illuminating step. It is well known in the art to provide additional components in a device and selectively activate them, for redundancy in case of component failure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide more than three light sources mounted on the object and only three light sources are illuminated during the illuminating step, in the method of Leis, to provide continuous functionality in case of failure of a light source.

Regarding Claims 26 and 30, Leis teaches the method and device in Claims 18 and 27, according to the appropriate paragraph above. Leis also teaches (see Fig. 1) a control unit (34) operably connected to the light sources being capable of controlling the light sources on the basis of signals transmitted by the control device (see Col. 5, lines 9-12). Leis does not teach the signals as *wirelessly* transmitted or a power supply for the light sources. It is well known in the art to provide remote devices as wirelessly controlled and battery-powered (such as remote controls for consumer electronics or computer mice) instead of wired, for improved versatility and portability. It would have been obvious to one of ordinary skill in the art at the time the



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invention was made to provide the signals as wirelessly transmitted and provide a power supply (such as a battery) for the light sources, in the method and device of Leis, to provide more flexibility of motion for the object.

7. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leis in view of Reymond et al. US Patent No. 4,209,254.

Regarding Claim 36, Leis teaches the device in claim 35, according to the appropriate paragraph above. Leis does not teach each recording device further comprising a filter, said filter allowing light to pass only if it is within the pre-determined emission spectrum. Reymond et al. teach (see Fig. 3) a similar device with a recording devices (RS) comprising a filter (71, 72) which allows light to pass only if it is within the pre-determined emission spectrum of a light source (infrared- see Col. 2, lines 60-63 and Col. 5, lines 49-51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a filter for the recording device as taught by Reymond et al. in the device of Leis, to provide further discrimination of the light sources for improved visibility of the light sources.

#### ***Allowable Subject Matter***

8. Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

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The invention as claimed, specifically in combination with the step of selecting the three light sources which define apices of a largest triangle that can be recorded from both positions and illuminating the three light sources that define the apices of the largest triangle, is not disclosed or made obvious by the prior art of record.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Menn et al. US 4,896,962, Ellis US 4,111,555, Reymond et al. US 4,193,689, and Stoutmeyer et al. US 3,917,412, teach similar devices for determining the position of an object.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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